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## ABSTRACT

For women, leaving home, marriage, childbearing, and remarriage can create drastic changes in income. Divorce or giving birth out of wedlock frequently accompanies entry into poverty, while marriage or remarriage often results in exit from poverty. In the United States since 1970, the increase in the number of poor women greatly exceeded that of poor men, resulting in a trend termed the feminization of poverty. This paper provides a theoretical and empirical analysis of changes in family structure over the last 15 years and their impact, by race, on this trend. In 1984, over 50 percent of black families with children were headed by women. In white families the figure was 15 percent. The increasing number of women in poverty stems not from poverty rates within various family structures but from changes in the distribution of women among family structures. Fewer women marry as more divorce, separate, or never marry. For both races, the poverty rate of female-headed families is 350 percent higher than that of husband-wife families. In 1983 black women were twice as likely as white women to be divorced. Because of the aging of the population and a projected decline in the number of poor single mothers between now and the turn of the century, it is likely that poverty will be defeminized, at least through the year 2000. References, tables and an explanation of the method of calculation used are appended. (LHW)

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FAMILY STRUCTURE, RACE, AND THE FEMINIZATION

OF POVERTY

by

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## I. Background

Leaving home, marriage, childbearing, and remarriage all play fundamental roles in the wellbeing of individuals over their life-cycles. For women, these events are often accompanied by drastic changes in income: divorce or bearing a child out of wedlock frequently accompanies entry into poverty, while marriage or remarriage often results in exit from poverty. In the United States between 1970 and the early 1980s the population of adults of both sexes living in poverty increased by about 30 percent: from 9.9 to 12.9 million adult women and from 5.9 to 7.7 adult men (Kniesner, 1983).<sup>1</sup> Although the ratio of poor women to poor men remained at 5 to 3 over this period, the increase in the number of poor women exceeded the increase in the number of poor men by more than 1.2 million. This greater absolute increase in the number of women living in poverty has been termed the feminization of poverty. In this paper we provide a theoretical and empirical analysis of changes in family structure over the last decade and a half and their impact, by race, on the feminization of poverty.

An important consequence of the feminization of poverty is that a large number of children are now being raised in poor families headed by women. Most recently available data, 1984, show that just over 50 percent of black families with children were headed by women. This compares to an already high 31 percent in 1970. The corresponding figures for white families with

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<sup>1</sup>All of the summary statistics in this section are available in Kniesner (1983) and also in more dispersed form in A Growing Crisis (1983), Money Income and Poverty (1983 and other years), and Statistical Abstract of the United States (1986 and earlier years).

children are just over 15 percent in 1984, up from 8 percent in 1970.

As suggested in Table 1 below, the secular increase in the number of women living in poverty during the 1970s and 1980s stems not from higher poverty rates within various family structures, but rather from changes in the distribution of women among family structures. Specifically, the proportion of women who are married has declined whereas the proportion who are divorced, separated, or never married has grown.

Table 1  
Poverty Rates by Family Structure<sup>a</sup>

|                              | 1970 | 1983 |
|------------------------------|------|------|
| husband-wife families        | 7 %  | 8 %  |
| female-headed families       | 25   | 28   |
| black female-headed families | 52   | 54   |

<sup>a</sup>For sources, see footnote 1 in the text.

For both races, the poverty rate of female-headed families is substantially higher than the poverty rate for husband-wife families — three-and-a-half times as high in 1983. Reflected in the higher incidence of poverty among black women are startling changes in black/white differences in marriage patterns. While divorce rates grew for both black and white women, in 1970 the odds that a black woman was divorced were about one-and-a-half

that of her white counterpart; by 1983 those odds were nearly two times as great.<sup>2</sup>

In light of these facts our basic research goal is straightforward. It is to analyze theoretically and empirically changes in family structure and the concomitant contribution to the trend known as the feminization of poverty. We do not wish to imply that changes in income that take a woman and her children below the poverty threshold are necessarily the only important issues. If one woman's annual income plummeted by \$10,000 to a level \$1 above the poverty line while another woman's income dipped by only \$100 but took her below the poverty line, we would be loath to judge the latter loss as more serious than the former (or vice versa). Nonetheless, counts of individuals above and below the poverty threshold are useful, though crude, indexes of economic well-being and often the ones used to target government welfare policies. Thus, this study of the feminization of poverty counts only income changes that cross the poverty threshold and change the poverty counts. It is important to point out, though, that we are not interested here in merely temporary dips in income below some threshold but rather poverty that exhibits some persistence. To check the robustness of our conclusions to the selection of the threshold we vary the income level that defines poverty by  $\pm 25$  percent, leaving the study of the size of income changes and utility-based welfare changes to future work. As we emphasize throughout this paper, persistent poverty among women is largely tied to marital status and family structure.

The next section of this paper summarizes evidence from micro panel data on the race differences in the flows into and out of poverty by women heads of households with children. Section III presents our theoretical framework for

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<sup>2</sup>For blacks, the odds rose from 81/1000 in 1970 to 230/1000 in 1983 while the corresponding odds for white women increased from 55/1000 to 120/1000.

analyzing the poverty experience of women — emphasizing the joint roles played by chance, choice, and exogenous background factors in the determination of family structure. Section IV presents corresponding estimated multivariate hazard functions for divorce and remarriage and their relationship to entry into and exit from poverty. The focus is on exogenous factors, including both welfare generosity and demographics. We conclude by conjecturing that (at least through the year 2000) poverty will be defeminized.

## II. Changing Family Structure and the Feminization of Poverty

For empirical analysis we chose The Ohio State University's National Longitudinal Survey of Young Women (NLSYW), which follows a large number (5,159) of young women (ages 14 to 24 years in 1967) at a stage in the life cycle when most marital and fertility transitions occur. Equally important, the NLSYW covers a fourteen-year period (1968-1982) that includes the tail end of a long trend when feminine poverty declined (1968 through the early 1970s) and the beginning of a long trend when feminine poverty increased — as well as cyclical variations around these two trends. This, coupled with an oversampling of blacks (1,459) that permits comparisons by race, gives the NLSYW data a decided edge in analyzing how women become poor single mothers, how long they remain so, and the events that trigger exits from this state. In contrast, the data bases commonly used to analyze poverty, the Current Population Survey (the source of the official U.S. poverty statistics) and the University of Michigan's Panel Study of Income Dynamics (as used, for example, in Bane and Ellwood 1986, and Danziger, et al., 1982) are not suitable for

this study: the former is basically cross sectional and the number of women in the latter is too small to study poor single mothers and much too small to make meaningful comparisons by race.

#### A. Definition of Family Structure

For the purposes of this research, we define family structure broadly as the intersection of legal marital status, family headship status, and living arrangements. Thus, a divorced woman living with her parents and children has a different family structure than that of a divorced woman living only with her children. Following the Census Bureau's terminology, we refer to a female head of household with dependents as a female family householder (hereafter FFH), or less formally, as a single mother (for a complete definition see Appendix A). The feminization of poverty occurred almost solely because of the startling growth of the number of female family householders: over 4 million more women were classified as FFH in March 1984 than in March 1970. Thus, we concentrate on quantifying the incidence of and forces behind the movement of women into and out of this FFH family structure during the early stages of their life-cycle.

#### B. Determining Poverty Status

Officially, a given family is classified as poor if its income lies below the threshold initially established by the Office of Management and the

Budget, and updated annually by the rate of inflation of the CPI.<sup>3,4</sup> Because we are not interested in momentary dips below the threshold (poor for a week or poor between paychecks), we recognize only those spells of poverty where a given family unit's annual income lies below the associated annual threshold. We establish the poverty status of each woman as of each survey date between 1968 and 1982, tracking both the family unit to which she belonged and the income of all members of those units.

The NLSYW asks respondents for their household's income by household member and category, including wages, farm and business income, unemployment insurance, alimony, and gifts from relatives. Remember that, among other things, we are interested in analyzing the impact of income support policy on the decisions of couples to divorce — decisions that add to the rolls of poor single mothers. Thus, government cash and in-kind transfers are excluded from our measure of income, while the parameters of the welfare system are treated as exogenous variables.<sup>5</sup> Likewise, the income of an absent or ex-husband is excluded from the family's total.<sup>6</sup>

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<sup>3</sup>The modal AFDC household consists of a single mother with two children. In 1982, the last year of our sample, the annual poverty threshold for the average three-person family was \$7693 (in 1982 dollars). (Statistical Abstract, 1986, p. 430.)

<sup>4</sup>We do not address the issue that the CPI may overstate the inflation rate and, thereby, overstate the feminization of poverty.

<sup>5</sup>By ignoring cash transfers, the discrepancy between our definition of poverty and that of the federal government is the number of individuals who are lifted out of poverty via such cash transfers.

<sup>6</sup>The financial aid that a woman receives from relatives and alimony payments were included but were quite meager. In the CPS for 1982, the last year of our sample, alimony payments to women 18 to 29 years of age were too few in number to compute a reliable mean. In 1981, only 40 percent of these women held child support awards; of these less than 50 percent actually received payments. For those who received payments in this young cohort, the average total payment was about \$100 per month. The average for all women is higher by only \$20 per month. (Statistical Abstract, 1985, p. 383.)

To check for the robustness of if our results with respect to the definition of poverty, we repeat our econometric analysis using 75 percent and 125 percent of the official OMB poverty thresholds. For more discussion of how we determine poverty status see Appendix B.

### C. Modes of Entry into FFH-poverty

At least 1101 women in the sample enter the FFH state at some time between 1969 and 1982. This count of 1101 omits those who either left the survey before their entry into FFH or had missing information that precludes ascertaining their poverty status. Excluding the 63 censored women who were in FFH poverty in the first survey year leaves 1038 women who were not already FFH-poor at the start of the survey.<sup>7</sup> Of these, 645 enter FFH-poverty at least once. We use only the first observed spell of FFH-poverty.<sup>8</sup> For the whites, 71 percent entered these spells of FFH-poverty via divorce or separation (henceforth "divorce"). The corresponding figure for the blacks is only 30 percent.

Entry into the FFH state often brings with it swift entry into poverty -- 59 percent of the FFH women are classified as poor the first time we observe them as single mothers. Moreover, of those who enter FFH but are not

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<sup>7</sup>This result is based on what we have referred to above as the 100 percent poverty threshold. From now on we discuss only the 100 percent poverty threshold unless there are substantive differences that arise when the threshold is varied.

<sup>8</sup>This avoids oversampling spells from multispell individuals. Although there is information in second and higher order spells, these spells tend to be associated with second divorces or other repeated changes in family type and are of secondary importance here.

immediately poor, few (only 12%) subsequently become poor during that spell of FFH. Second, because of their lower marriage, higher divorce, and lower remarriage rates, the incidence of FFH-poverty is substantially higher among young black women — in our sample 24 percent of young black women but only 7 percent of young white women are observed to experience at least one spell of FFH-poverty.

Finally, recall that we disregard temporary income fluctuations. Consequently, we find that only 0.6% of whites and 3.4% of blacks with known entry modes begin a spell of FFH-poverty with a drop in income that is unaccompanied by a change in family structure. This means that over 99% of white and almost 97% of black initial spells of FFH-poverty commence with a change in family structure. For these data, entry via bearing a child out of wedlock is a rare event: despite a sample size of over 5,000 in the NLSYW, their youth, and the oversampling of blacks, we observe only 16 white and 29 black entries into FFH-poverty via a birth out of wedlock<sup>9</sup> -- numbers too small to support separate econometric analysis.

#### D. Poverty Durations and Exit Modes

There are large race differences in durations of spells of FFH-poverty. For whites, over four-fifths of the spells of FFH-poverty ended within two years; for blacks, only about two-thirds did so. Similarly, (adjusting for the censoring implied by sample attrition as well as missing data on

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<sup>9</sup>If the woman is in FFH poverty in the current survey but was unmarried and without children on the previous survey, then her entry mode was defined as entry via birth out of wedlock.

poverty), the average duration of a spell of FFH-poverty was about 3.8 years for blacks but only 2.5 years for whites. Before missing data on a noninterview year intervened, we were on average able to track FFH-poverty for slightly over 3 years for blacks and about 2.2 years for whites.

Just as they dominate entry, changes in family structure also dominate exit modes from FFH-poverty in our data. For whites, the modal change in family structure leading to exit from FFH-poverty is (re)marriage (almost 48 percent). For blacks, (re)marriage accounts for only 31 percent of exits due to changes in family structure, leaving exits to the household of another adult (34 percent) — often the parent's household — as the modal avenue for exiting poverty. Exiting FFH-poverty by joining the household of another adult is relatively unimportant for whites (12 percent). Overall, changes in family structure account for 67 percent of white and 70 percent of black exits. This leaves increases in income unaccompanied by a change in family structure to account for only about one-third of white and less than one-third of black exits. For more details, the reader is referred to the tables on mode of entry by mode of exit (Appendix C) and on year of entry by year of exit (Appendix D).

### III. Poverty Spells, Matching, and Changing Family Structure

As just seen, most observed first spells of FFH-poverty both commence and terminate with a change in family structure; isolated income changes (that is, income changes that are unaccompanied by a change in family structure) are relatively unimportant. With this in mind, we now sketch the theoretical

model of changing family structure that guides our subsequent econometric analysis.

#### A. Entry into Poverty via a Change in Family Structure

In economic models of the family such as Becker (1981), changes in family structure, such as divorce, are attributed to surprises that render a particular family structure suboptimal. These surprises are unexpected bad or good outcomes (such as changes in income, health, or employment) that must be in principle unforeseeable at the time the family structure was established. Consider, for example, the case of a marriage. For a given surprise, the personal characteristics of the couple as well as their economic environment condition the likelihood of divorce. In this way, a change in family structure such as a divorce shares many features with labor turnover (quits and layoffs). The subsequent theoretical discussion of changing family structure synthesizes the theoretical analysis of the family and that of job search and employer-employee matching (see Lippman and McCall 1976, Jovanovic 1979, and Mincer and Jovanovic 1981). For pedagogical convenience, the theoretical model we develop in the rest of this section is couched in terms of divorce and remarriage, which are used as generic terms for the dissolution of one family structure and the subsequent reconstitution of another.

In an efficient marriage market, a couple remains married if marital output exceeds the sum of the expected outputs each spouse could receive if they divorced. For a match that has lasted for  $t$  periods, let expected present value of total marital output consist of a systematic component,  $M(t)$ , and a random component,  $m(t)$ . Likewise, let their expected present value of

individual incomes once divorced sum to a systematic component,  $D(t)$ , plus a random component,  $d(t)$ . Hence, a couple divorces at time  $t$  iff

$$(1) \quad M(t) + m(t) < D(t) + d(t) ,$$

where  $D$  and  $d$  are net of any transaction costs of divorce. Rewriting (1), the couple divorces iff

$$(2) \quad U(t) < u(t) ,$$

where the expected present value of the systematic marital gain is

$$(3) \quad U(t) \equiv M(t) - D(t) ,$$

and the surprise marital loss is

$$(4) \quad u(t) \equiv d(t) - m(t) .$$

Over the course of a marriage, the value of the marriage increases, inter alia, with marriage-specific capital,  $x(t)$ , or

$$(5) \quad M(t) = M(x(t)) \text{ with } \frac{\partial M}{\partial x} > 0 .$$

The accumulation of marital-specific capital is assumed to obey

$$(6) \quad x(t, k_0) = k_0 + k(t) \text{ with } \frac{\partial x}{\partial k_0} = 1, \frac{\partial x}{\partial t} = \frac{\partial k}{\partial t} > 0 ,$$

where  $k_0$  measures the quality of the match at the beginning of the marriage, and  $k(t)$  is cumulated marital capital as of  $t$ . Likewise, as the length of the marriage increases there may be systematic changes in the sum of their divorced incomes,  $D(t)$ . Relative to changes in  $M(t)$ , these changes in  $D(t)$  are likely to be small. For analytical convenience, we assume that  $\frac{\partial D}{\partial t} = 0$ .

A given marriage faces a distribution of internal ( $m$ ) and external ( $d$ ) surprises. Periodically, surprises arrive from the distribution of surprise marital losses  $u \equiv d - m$  (a sudden illness, a new job opportunity). These possibilities are characterized by a cumulative distribution function  $F(u)$ , with  $F' \equiv f > 0$ ,  $F(-\infty) = 0$  and  $F(\infty) = 1$ . Across-the-board improvements in opportunities outside of a marriage shift up the cumulative distribution. For example, a recession may put a husband out of work. This is manifested as a large, negative  $m$  (a surprise marital loss). When such a surprise marital loss arrives, a couple compares the present value of the systematic marital gain,  $U(t)$ , to their current draw on marital loss,  $u(t)$ . Assuming that the couple knows (the moments of) the distribution of surprise marital losses, and that decisions to divorce are made sequentially and irrevocably, then there is a reservation level of marital gain — namely the current level,  $\bar{U}(t) \equiv \bar{M}(t) - \bar{D}(t)$ . If  $u(t) > \bar{U}(t)$ , then they divorce. Thus, given a draw from the distribution of surprise marital losses,  $F(\cdot)$ , a marriage dissolves with probability

$$(7) \quad 1 - F[\bar{M}(x(t, k_0)) - \bar{D}(t)] .$$

Finally, assume that new information on the offer distribution is a rare event that follows a Poisson probability law with parameter  $\lambda$ . Given that a marriage has lasted until time  $t$ , the probability of divorce at time  $t$  (the

hazard rate), is given by

$$(8) \quad h(t) = \lambda[1 - F(\bar{M}(x(t, k_0)) - \bar{D}(t))]$$

(see Kalbfleisch and Prentice, 1980). In equation (8), the reservation utility level,  $\bar{M} - \bar{D}$ , embodies the choice to divorce, whereas  $\lambda$  and  $F(\cdot)$  manifest the chance elements in divorce. Using the result that  $\frac{\partial U}{\partial M} = \frac{\partial x}{\partial k_0} = 1$ , the salient properties of the hazard function in (8) are:

$$(i) \quad \partial h / \partial k_0 = -\lambda f(\bar{M} - \bar{D}) \frac{\partial M}{\partial x} < 0, \text{ and}$$

$$(ii) \quad \partial h / \partial t = -\lambda f(\bar{M} - \bar{D}) \frac{\partial M}{\partial x} \frac{\partial k}{\partial t} < 0.$$

That is, (i) couples who are well-matched (who have a large  $k_0$ ) are less likely to divorce, and (ii) as long as the rate of accumulation of marital-specific capital is positive (and therefore marital output increases with the duration of the marriage), the probability of divorce declines with the length of time married.

There are six ways in which environmental factors and past decisions condition the exit rates from marriage. We see this more easily by rewriting the hazard (8) as

$$(9) \quad h(t, k_0; z_1, z_2, z_3, z_4, z_5) = \lambda(z_5) \{1 - F[\bar{M}(x(t, k_0; z_1); z_2) - \bar{D}(z_3); z_4]\},$$

where the  $z$ 's are shift parameters for the five functions involved in the right hand side of (9). In equation (9),  $k_0$  includes all those factors that increase the initial quality of the match;  $z_1$  includes all those factors that

increase the rate of accumulation of capital therein;  $z_2$  includes factors that increase the utility of either spouse in the match apart from increasing the initial level of match specific capital. Similarly,  $z_3$  includes all variables that increase the sum of divorced outputs,  $D$ . The remaining two shift factors in (9) are  $z_4$ , which captures the influence of variables that increase the probability of favorable alternatives to the match (that is, a location parameter that shifts the distribution of surprise marital losses to the right, thereby increasing the hazard rate of exit from marriage), and  $z_5$ , which contains factors that increase the arrival rate of alternative offers. The elements in  $k_0$ , and  $z_i$  ( $i=1, \dots, 5$ ) are not necessarily mutually exclusive. To summarize,

$$(iii) \quad \frac{\partial h}{\partial k_0} < 0, \frac{\partial h}{\partial z_1} < 0, \frac{\partial h}{\partial z_2} < 0, \text{ while } \frac{\partial h}{\partial z_3} > 0, \frac{\partial h}{\partial z_4} > 0, \frac{\partial h}{\partial z_5} > 0.$$

The empirical measures of these shift variables will be identified in the next section.

#### B. Exits from Poverty via a Change in Family Structure

Once divorced, a mother becomes FFH -- if only momentarily. We employ a hazard function for exit from FFH that parallels the previous hazard for entry into FFH. In the obvious notation,  $\lambda^*$  is the arrival of information on alternatives to FFH,  $k_0^*$  is the initial FFH-specific human capital the woman has at the beginning of her spell of FFH,  $x^*(\tau)$  is the FFH-specific human capital accumulated in the  $\tau$  periods since the beginning of the spell of FFH,  $M^*(\tau)$  is the present value of her expected utility in this state,

$D^*(\tau)$  is her expected level of utility in the next best alternative family structure,  $U^*(\tau) \equiv M^*(\tau) - D^*(\tau)$  is the present value of her expected systematic net gain from remaining FFH,  $u^*(\tau) \equiv d^*(\tau) - m^*(\tau)$  is her surprise net loss from remaining FFH,  $F^*(u^*(\tau))$  is the distribution of the surprise net losses in the next best family structure, and  $1 - F^*(\bar{U}^*(\tau))$  is the probability that she leaves FFH, where  $\bar{U}^*(\tau) \equiv \bar{M}^*(\tau) - \bar{D}^*(\tau)$  is her current systematic gain from FFH. The derivatives of these functions are the same as their unstarred counterparts above. Thus,

$$(10) \quad h^*(\tau, k_0^*; z_1^*, z_2^*, z_3^*, z_4^*, z_5^*) = \lambda^*(z_3^*) \{1 - \bar{F}^*[\bar{M}^*(x^*(\tau, k_0^*; z_1^*); z_2^*) - \bar{D}^*(z_3^*); z_4^*]\}$$

is the hazard rate for leaving FFH given a duration of  $\tau$  periods. The  $z_1^*$  in (10) are shift variables and the partials of (10) with respect to them are

$$(iv) \quad \frac{\partial h^*}{\partial k_0^*} < 0, \frac{\partial h^*}{\partial z_1^*} < 0, \frac{\partial h^*}{\partial z_2^*} < 0 \quad \text{while} \quad \frac{\partial h^*}{\partial z_3^*} > 0, \frac{\partial h^*}{\partial z_4^*} > 0, \frac{\partial h^*}{\partial z_5^*} > 0.$$

#### IV. The Ins and Outs of FFH-Poverty

It is important to re-emphasize that 98 percent of all poverty spells of the single mothers in our data begin with a change in family structure, most frequently divorce. We also saw that changing family structure -- particularly remarriage -- dominates isolated income changes in moving women out of poverty. Thus, the foregoing theoretical analysis of family structure and the implied hazard functions also describe the transition rates into and out of FFH-poverty.

Based on the model of family formation and reformation developed in Section III, this section first specifies the associated dynamic empirical model of entering and exiting spells of FFH-poverty. Next, we briefly describe the estimation procedure and associated independent variables. The final part of this section presents and discusses our empirical results.

#### A. Specification of the Hazard Functions

For the empirical implementation of (9) and (10) we chose the proportional hazard specification of Cox (1972) because of its well-known advantages -- the main one being its nonparametric character in the form of an unspecified base-line hazard ( $g(t)$  and  $g^*(\tau)$  in (11) and (12) below). Although it might prove enlightening to estimate an elaborate competing risks model for various modes of poverty exit (wherein different modes of exit compete to be the first effective mode), there are well-known problems with competing risk models, including doubts about identifiability. (For an interesting discussion, see Diamond and Hausman, 1984) and the references therein.) We estimate separate hazards for (9) and (10) rather than a full-information hazard a la Flinn and Heckman (1981) for several reasons. There are, of course, always doubts about specification. In general, single-equation techniques quarantine the effect of misspecification to that equation and prevent it from spreading to the parameters estimates in the remaining equation(s). Secondly, the main gain from full-information methods is increased efficiency. In our case, we have a sufficient number of observations so that efficiency is not a major concern. This, in conjunction with the greatly increased computational burden of full-information methods,

swayed us to single-equation techniques.

In light of the discussion in the last paragraph, the functional form specified for the entry hazard (9) is

$$(11) \quad h(t, z) = g(t) \exp(zb) ;$$

the parallel functional form for the exit hazard (10) is

$$(12) \quad h^*(\tau, z^*) = g^*(\tau) \exp(z^*b^*) .$$

Here  $z \equiv (k_0; z_1, z_2, z_3, z_4, z_5)$ , and  $z^*$  is analogously defined for the exit hazard. Note that in (11),  $\exp(zb)$  is the the product of  $\lambda(z_5)$  and another exponential function that is linear in  $z$ . Thus, if a variable (such as father's occupation) enters both  $k_0$  and  $z_2$ , its corresponding element in  $b$  is the sum (or difference) of two structural coefficients. Similar remarks apply to the elements of  $b^*$  in (12). Finally, it is important to keep in mind that each component of  $b$ ,  $b_i$ , is interpreted as the proportionate change in the hazard due to a unit increase in the corresponding element of  $z$ , or  $\partial \ln h / \partial x_i$ . The exponentiated coefficient,  $e^{b_i}$ , is interpreted as the proportionate rate of change of the hazard due to an increase in  $x_i$  (hence the name, proportional hazard model).

#### B. Factors that Explain FFH-Poverty Entry and Exit

In section II.A above we explained both our choice of data set and our measure of poverty. Subject to data constraints due to missing values, we selected a parsimonious list of measured explanatory variables corresponding

to the vectors  $z$  and  $z^*$  in our theory. We chose only variables that are truly predetermined, and, other things equal, of policy relevance.

Of particular interest is the AFDC variable, which is an index of welfare generosity in the state of residence. Parameterizing the tangled safety net of AFDC payments, housing benefits, medicaid, and foodstamps is essentially hopeless. For example, our initial work included a three-parameter representation of the AFDC budget constraint: a slope, an intercept, and a dummy variable for states with AFDCUP. These added no additional explanatory power to the simple AFDC index used here (the maximum benefit available in a state to a three-person family). It has been forcefully argued elsewhere (for example, Bane and Ellwood, 1985) that this maximum benefit level is probably the best possible instrument for a "correct" index of total welfare generosity. The map of the states' maximum AFDC payments shows enormous relief: the highest peaks are \$719 and \$555 for Alaska and California, respectively; the low spot is Mississippi with \$96 per month. Over time, these relative heights vary little, although the illusive differential enforcement of eligibility rules might alter this picture.

We view fertility as jointly determined with changes in family structure such as divorce. Hence, KIDS is not an independent variable for hazards explaining transitions from non-FFH to FFH-poverty or from non-FFH to FFH. In contrast, once a woman is FFH, the number of children in the survey prior to entry into poverty (KIDS) is exogenous. Hence, we included KIDS as an explanatory variable in the econometric analysis of dips below the poverty line following entry into FFH as well as in the FFH-poverty exit hazards.

Also included in the exit but not the entry hazards is UCYCLIC, our measure of the aggregate cyclical unemployment rate. We cannot use UCYCLIC in the entry hazards because all spells of non-FFH-poverty begin in the first

sample year, making the variable identical for all respondents for all durations.

The complete set of independent variables (the  $x_i$ 's and  $x_i^*$ 's) for each hazard appears in Table 2. Also listed are the expected signs of the partial effects of the independent variables on the hazard for entry into (exit from) FFH-poverty. These have appeared as equations (iii) and (iv) in the last section and can be obtained via the relationships

$$(13) \quad \frac{\partial h}{\partial x_i} = \frac{\partial h}{\partial z_j} \frac{\partial z_j}{\partial x_i}, \quad \text{and} \quad \frac{\partial h^*}{\partial x_i^*} = \frac{\partial h^*}{\partial z_j^*} \frac{\partial z_j^*}{\partial x_i^*}.$$

In panel A, the plus and minus signs above the column headers record the signs of  $\partial h / \partial z_j$  in accordance with (iii) above; the signs in the table are those of  $\partial z_j / \partial x_i$ . The sign of the product --  $\partial h / \partial x_i$  -- is in the next-to-last column of Panel A. For example,  $k_0$  includes variables that increase initial marital specific capital, while  $z_2$  includes variables that increase the couple's well-being while married; both, in turn, decrease the divorce hazard ( $\partial h / \partial k_0 < 0$  and  $\partial h / \partial z_2 < 0$ ) as indicated by the minus signs above  $k_0$  and  $z_2$ . Further,  $\partial k_0 / \partial \text{TWOPAR} > 0$  and  $\partial z_2 / \partial \text{TWOPAR} > 0$  are indicated by the plus signs following TWOPAR. This means that the model predicts

$$\frac{\partial h}{\partial \text{TWOPAR}} = \frac{\partial h}{\partial k_0} \frac{\partial k_0}{\partial \text{TWOPAR}} + \frac{\partial h}{\partial z_2} \frac{\partial z_2}{\partial \text{TWOPAR}} < 0, \quad \text{as indicated by the corresponding}$$

minus sign in the next-to-last column of Panel A. In a parallel fashion, Panel B of Table 2 summarizes the empirical predictions of our exit hazard.

### C. Varying the Poverty Threshold

All of the econometric results reported in subsequent sections are based on the official poverty threshold. Results obtained using first a poverty threshold of 75 percent of the official poverty line and then 125 percent of the official poverty line are suppressed for the following reason. Obviously, because the poorer poor are disproportionately black and the richer poor are disproportionately white, decreasing the poverty threshold not only decreases the number of respondents who fall into FFH-poverty but also increases the proportion of black who do so. The converse holds for increasing the poverty threshold. We observe, however, no additional interesting variations in our results when we changed the poverty line substantially ( $\pm 25$  percent) — the signs, sizes, and significance of coefficients remained remarkably similar. Consequently, the empirical results we discuss are based exclusively using the official poverty line.

### D. Becoming a Poor Head of Household

The first four columns in Table 3 present exponentiated hazard function coefficients for entry into FFH-poverty (the  $e^{\hat{b}_i}$  from equation (11)). If  $x_i$  increases by one unit, the implied proportionate change in the hazard function is  $e^{\hat{b}_i}$ . Note that if  $\hat{b}_i$  is positive (negative), then  $e^{\hat{b}_i}$  is greater (less) than one. The absolute values of the t-ratios for the associated coefficients,  $(\hat{b}_i/\hat{\sigma}_{\hat{b}_i})$ , appear in parentheses.

Of major interest are the similarities and differences in how blacks and whites enter and leave FFH-poverty. Because blacks are more likely to divorce

and also to have lower income levels, they are much more likely to become poor heads of households. In particular, the first column of Table 3 shows that, at any instant, not controlling for any other factors, we estimate young black women to enter FFH-poverty at 3.92 times the rate of their white counterparts. Column 2 shows that after controlling for family background, age, a measure of human capital, as well as for interstate variations in AFDC generosity, in per capita income and in the gender mix,<sup>10</sup> young black women still enter FFH-poverty at about 2.7 times the rate of their white counterparts.

The transition to FFH-poverty can occur in two steps — a change in family status leaving the woman FFH followed by a movement below the poverty line — or in a single step straight to FFH-poverty. To clarify the difference, we have resolved the single-step transition for the pooled data (column 2) into the events: (i) the transition (of 817 women) to FFH status ( $\overline{\text{FFH}} \rightarrow \text{FFH}$  hazards by race in columns 5 and 6); (ii) logit analysis of which 479 of these 817 women are poor upon arrival in FFH (logit regression in column 7); and (iii) for those 338 who were not poor upon arrival, the subsequent transition of 43 of them to FFH-poverty.

Using this resolution we see that in column 3 (4), other things the same, young white (black) women from intact families of origin (TWOVAR = 1) become single mothers at just under (somewhat over) sixty percent of the rate of their counterparts from broken families. They become poor single mothers at even lower rates (columns 3 and 4). Young black women whose fathers had a relatively high socioeconomic status (DUNCAN) are dramatically less likely to become single mothers (column 6) and poor single mothers (column 4) — with these effects much less pronounced for whites. For both races, more human

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<sup>10</sup>These latter three variables are time-varying in that they change as a respondent moves from state to state.

capital (as measured by KWW) clearly retards both entry into FFH status (columns 5 and 6) and the chances of being poor upon that entry (column 7). For those who become single mothers but are initially not poor, more children just prior to entry into FFH speeds eventual transition to poverty (column 8). However, none of the measures of background or human capital seem to promote or retard these transitions.

As was indicated in Table 2, the percent of females in the population increases expected divorced income for men, but decreases it for women, and therefore has a theoretically ambiguous effect on the divorce hazard. As column (6) shows, black women in states with one more percentage point (which is about two standard deviations) of females in the population have a 27 percent higher risk of single motherhood. Their risk of poor single motherhood is even greater (column 4). For blacks, the increase in the male's expected income upon divorce evidently outweighs the decrease in the female's expected income. We find no such effect for whites.

The preponderance of respondents who appear to become householders and poor simultaneously (479 of the 522 who became FFH poor in our sample) corroborates the aggregate time-series evidence cited in Section I that the feminization of poverty is closely linked to the secular trend in divorce. One of the main implications we should draw from the first eight columns of Table 3 is that factors hastening entry into female family householder status (columns 5 and 6) are also the factors underlying the increasing rate of entry over time into FFH-poverty (columns 1 through 4). Apart from STATEY, most of our independent variables help to explain rates of entry into FFH and into FFH-poverty. Further, all of these entry hazards underline the importance of a good economic start in life and the subsequent accumulation of human capital. Nonetheless, once a woman becomes FFH few of our independent

variables help to explain either immediate (column 7) or subsequent (column 8) moves below the poverty line. Only (i) growing older, (ii) more knowledge of the workplace and (iii) fewer children just prior to entry into FFH seem to reduce the initial probability of poverty. For those who change family status but are not immediately poor, column 8 shows that only more children just prior to entry into FFH hasten subsequent movements below the poverty line.

Life-cycle effects are reflected in the coefficients of AGE and AGESQ in Table 3. In the lower part of the table, we draw the shape of the implied parabolas, indicate the sample mean with a dot, and report the turning points as AGE turn. Where the turning point is so far from the mean as to be outside of the relevant range (for example, AGE turn = 114 years in column 8), only one leg of the parabola is shown. Note that the chances of becoming a single mother and of becoming a poor single mother increase until roughly age 29 for whites and 25 for blacks; they decrease thereafter. This pattern reflects the fact that FFH status is almost always preceded by the set of events marriage, child bearing, and divorce, and that by their mid to late twenties nearly 80 percent of women have been married (Statistical Abstract of the U.S., 1986, p. 38). Beyond ages 28 or 29 for whites and age 25 for blacks, further aging retards both entry into FFH and FFH-poverty, possibly reflecting (i) the development of marital-specific capital that outweighs the development of labor market capital and (ii) a general decline in alternative marital opportunities to both spouses.

The impact of AFDC support has also been specified as a parabola. In the same manner as for AGE, the turning point (AFDC turn), shapes, and sample means for these parabolas are reported in the lower portion of Table 3. Recall that while government transfer policies are exogenous, the amounts transferred are endogenous and thereby excluded from the income we used to

ascertain poverty status. The strength of the entire income maintenance safety net for each state is proxied by monthly maximum AFDC payments.<sup>11</sup> We find that throughout the observed range, greater welfare generosity increases entry into single motherhood and thereby entry into poor single motherhood. The estimated coefficients in Table 3 imply that if welfare generosity increased so that our index rose by \$100 per month, then white women would enter FFH-poverty at a 12 percent higher rate (column 5) and black women would enter at a 22 percent higher rate (column 6), *ceteris paribus*.<sup>12</sup> These increases reflect elasticities of the probability of becoming a female family householder with respect to AFDC payments of 0.33 for white and 0.53 for black women. We cannot, however, detect any secondary impact of AFDC generosity on earnings or other income of single mothers. Specifically, women in states with relatively generous income maintenance systems are no more or less likely to fall beneath the poverty threshold either immediately upon entering FFH (column 7) or subsequently (column 8) than otherwise similar women in states with less generous systems.

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<sup>11</sup>Note that state per capita income (STATEY) and the percent of the state population that is female (%FEMALE) help to shield these results from contamination due to unmeasured differences across states. Unreported results using a dummy variable for the presence of a state AFDC-UP program produced no significant differences among states.

<sup>12</sup>Ellwood and Bain (1985) report a 10 percent increase in divorce by women of all ages due to a \$100 per month increase in monthly maximum AFDC payments.

### E. Escaping FFH-Poverty

Young black women not only enter FFH-poverty at higher rates than their white counterparts but also exit FFH-poverty more slowly and, consequently, have longer average spells. The last four columns of Table 3 report the exit hazards for pooled (columns 9 and 10) and race-stratified (columns 11 and 12) hazards. Isolated changes in income play a relatively small role in exits for both races (one-third of white and less than one-third of black exits), leaving changes in family structure as the dominant exit mode. Of these changes in family structure that result in poverty exit, remarriage accounts for nearly three-quarters of the white but less than half (44%) of the black transitions (see Appendix C).

As seen in Table 3, the average young black single mother exits poverty at only about half the rate of her white counterpart (column 9); even controlling for all other variables in Table 3, blacks still exit FFH-poverty at only about two-thirds the white rate (column 10). More generous welfare programs as indexed by AFDC do not appear to retard exits from FFH-poverty. Indeed, for blacks, more generous programs appear to hasten exits. (Remember that income is measured exclusive of government transfers.)

Poor single mothers are more than twice as likely to exit FFH-poverty via a change in family structure than via an isolated change in income (Appendix C). This is some evidence that single mothers with more children may exit poverty (often via remarriage) at slower rates. Although changes in family structure dominate FFH-poverty exits, nonetheless columns 11 and 12 show that other things equal (including welfare policy), the human capital of a single mother is a significant determinant of her chance of rising above the poverty threshold. More market human capital (as measured by KWW), and, at least for

whites, coming from a family with a higher socioeconomic status (as measured by DUNCAN) are both associated with significantly higher exit rates. Likewise, for both races aging seems to promote exit up through approximately age 30; after that, aging is associated with a significant decline in exit rates. It appears that general human capital accumulation dominates exit probabilities in early years but is overshadowed by the negative effects of age on remarriage in later years.

The marketability of human capital depends upon the state of the economy as a whole. We estimate that an increase of one percentage point in the cyclical unemployment rate (UCYCLIC) retards by one-third the exit rates of young black mothers. The observed retardation is somewhat greater for whites. In typical postwar U.S. recessions, the unemployment rate rose by about 3.5 percentage points (Zarnowitz, 1985). This suggests that during a recession the poverty exit rate for young white mothers will be only about 18 percent of what it is during a period of full employment. The analogous figure for young black women is 25 percent. This implies that the business cycle affects white FFH-poverty durations relatively more than black FFH-poverty durations.

In conclusion, it should be emphasized that changes in family status dominate movements into and out of FFH-poverty. Further, the institution of marriage works much better at keeping young white women out of poverty than at keeping young black women out of poverty. One clue is that of young women who exit FFH-poverty via (re)marriage, only 6 to 20 percent of whites do so to marriages that are below the poverty line, whereas 15 to 40 percent of blacks exit to marriages that are below the poverty line (see Appendix C).

## V. The Importance of Demographics and the Future Defeminization of Poverty

In studying poverty, our research underscores the overwhelming importance of the institution of marriage. The trend known as the feminization of poverty reflects a sharp increase in the fraction of women with children but without husbands. The relatively small proportion of black women who are married goes a long way toward explaining the higher poverty rates of young black women. Using the estimated hazard functions for poverty entry and exit in Table 3 we can tentatively rule out several possible explanations of the feminization of poverty. For example, while we find that welfare generosity affects interstate differences in poverty rates, such programs have trended in a direction that should have slowed the feminization of poverty. In particular, between 1970 and 1984, average real AFDC benefits fell by about 66 percent (Statistical Abstract of the United States, 1986, pp. 379 and 477). Likewise, our parameter estimates rule out the secular increase in the proportion of women who come from broken families of origin as quantitatively important in explaining the feminization of poverty. In short, we find that the feminization of poverty over the last 15 years stems largely from demographics: a great increase in the number of women in their childbearing years coupled with the (as yet unexplained) secular upward trend in the fraction of unmarried mothers.<sup>13</sup> Economists emphasize the role of the sex and age composition of the labor force in determining the so-called normal

<sup>13</sup> See, for example, Michael (1985) who finds that the time-series of divorce rates in the United States seems to statistically "lead" other important trends.

unemployment rate. In a parallel fashion our empirical results underscore the intertwined roles of population demographics, the marriage market, and family structure in explaining the size of the female poverty population and the trend known as the feminization of poverty.

In conclusion, we note that our results indicate that aging tends to retard entry into FFH-poverty more than it retards exit. This is important because the U.S. population of women is now aging. From 1970 to 1983, the core of the period when poverty was feminized, the number of women 18 to 24 years old rose by over 2.6 million. Compare this to what is predicted to happen between now and the year 2000: the population of women ages 18 to 24 is projected to fall by about 2 million (Statistical Abstract of the United States, 1986, p. 25).<sup>14</sup> These data suggest, then, that the number of poor single mothers with children will decline between now and the year 2000. The down-side of this story is, however, that single mothers will probably continue to rear a growing fraction of U.S. children. The fundamental structural changes in families analyzed here cry out for further economic research.

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<sup>14</sup> The significance of this can be most easily understood by noting that through the end of this century the total population of U.S. women is expected to rise by 25 million.

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## Appendix A

### DEFINITION OF FFH

A woman is defined as an FFH if she is the head of her household and she has children in the household. She is the head of the household if she is (i) not married spouse present\*, and, (ii) reports herself as either the head of the household or as the sister of head of household but no related adults (including the sister) are present. She is not the head of the household if she is either (iii) married spouse present, or (iv) does not meet (ii) above. By this definition a female family householder could have dependent parents.

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\*We define married spouse present as (1) Married, spouse present, or (2) Married, spouse absent and in the armed forces.

## Appendix B

### CALCULATING POVERTY STATUS

The National Longitudinal Survey of Young Women (NLSYW) interviewed respondents who were ages 14-24 in 1968. These interviews were conducted annually from 1968 to 1982 (excepting 1974, 1976, 1979 and 1981). In each survey year, the respondents were asked detailed questions about the last calendar year's income and current family structure. For each survey year we ascertained family structure and poverty status. This allowed us to create beginning and ending years for FFH and FFH-poverty status as well as censor codes for noninterview and missing income.

Occasionally, respondents claimed no income or income transfers of any kind. We assumed that these respondents had "missing" income and therefore classified their poverty status as missing as well. When other income data indicated that the household was above the poverty threshold, respondents were designated as nonpoor even though income was missing from particular categories. In some cases, the composition of the family unit was problematic. In particular, some households had a member (other than the spouse) who was age 14 or older, and this extra member, perhaps a teenage son or the woman's parent, may have contributed income. In this case, the income of the woman (and her spouse if present) was used as a lower bound on family income. The separate questions on the categories of household income were used to establish upper and lower bounds. We combined these to arrive at upper and lower bounds for household income. Where working-age nonspouses are

present, the lower bound is the maximum of the lower bound income revealed by the income questions and the lower bound of the income category selected. The upper bound is the minimum of the income sum (possibly missing) and the upper bound for the category selected. For each family we compared these upper and lower income bounds to the real poverty threshold.

- (i) If the upper bound is less than the threshold, then a woman is called poor.
- (ii) If the lower bound is greater than the threshold, then she is called not poor.
- (iii) Otherwise, if the woman was FFH, on AFDC and not living with working-age relatives, then we classified her as poor.

The problematic case is where the threshold lay between the upper and lower income bounds and the woman did not receive AFDC.

- (iv) If she does not live with other working age persons, then poverty status is missing.
- (v) If she lives with other working age persons (husband excepted), then she is classified as poor if the poverty threshold is greater than the midpoint of the upper bound and lower bounds.

Missing values on questions regarding wages were patched up using self-reported usual hours worked per week, weeks worked in the past year, and hourly wages. Our calculation of income was checked against the key variables in the NLSYW data tape. The wage imputations were then introduced and AFDC and food stamp income netted out.

Finally, to calculate poverty thresholds for minors-only households, we defined the head as an "adult" for the purposes of selecting the family type in the poverty tables.

# Appendix C

MODE OF ENTRY INTO FFH-POVERTY BY MODE OF EXIT FROM FFH-POVERTY FOR WHITES (FOR BLACKS)

| percent                                                                                      | married            |               |                                          | other<br>change<br>in<br>family<br>structure | isolated<br>increase<br>in<br>income | ROW<br>TOTAL     |
|----------------------------------------------------------------------------------------------|--------------------|---------------|------------------------------------------|----------------------------------------------|--------------------------------------|------------------|
|                                                                                              | to non-<br>poverty | to<br>poverty | to<br>indeterminant<br>poverty<br>status |                                              |                                      |                  |
| separated,<br>divorced,<br>and married<br>spouse absent                                      | 26.7<br>(5.1)      | 1.2<br>(2.8)  | 6.7<br>(2.8)                             | 10.9<br>(11.3)                               | 25.4<br>(7.9)                        | 70.9<br>(29.9)   |
| birth<br>out of<br>wedlock                                                                   | 1.8<br>(4.0)       | 0.0<br>(0.0)  | 0.0<br>(1.1)                             | 2.4<br>(6.8)                                 | 1.8<br>(5.1)                         | 6.1<br>(17.0)    |
| isolated<br>drop in<br>income                                                                | 0.0<br>(0.0)       | 0.0<br>(0.0)  | 0.0<br>(0.6)                             | 0.0<br>(1.7)                                 | 0.6<br>(1.1)                         | 0.6<br>(3.4)     |
| left the<br>household of<br>another<br>adult                                                 | 7.3<br>(9.0)       | 1.2<br>(1.7)  | 0.6<br>(2.8)                             | 4.8<br>(19.2)                                | 3.0<br>(13.0)                        | 17.0<br>(45.8)   |
| income<br>fell and<br>had another<br>child                                                   | 2.4<br>(0.6)       | 0.0<br>(0.0)  | 0.0<br>(0.6)                             | 0.6<br>(0.0)                                 | 2.4<br>(2.8)                         | 5.4<br>(4.0)     |
| COLUMN TOTAL                                                                                 | 38.2<br>(18.6)     | 2.4<br>(4.5)  | 7.3<br>(7.9)                             | 18.8<br>(39.0)                               | 33.3<br>(29.9)                       | 100.0<br>(100.0) |
| 66.7% exit via a change in family structure<br>(70.1% exit via a change in family structure) |                    |               |                                          |                                              |                                      |                  |

Appendix D

YEAR OF ENTRY BY YEAR OF EXIT FOR WHITES (FOR BLACKS)

| Year of Entry<br>(Percent) | Year of Exit |              |              |                |                |                |                |                |              |                  |
|----------------------------|--------------|--------------|--------------|----------------|----------------|----------------|----------------|----------------|--------------|------------------|
|                            | 1970         | 1971         | 1972         | 1973           | 1975           | 1977           | 1978           | 1980           | 1982         | TOTAL            |
| 1969                       | 5.4<br>(3.4) | 1.2<br>(2.3) | 0.6<br>(1.7) | 0.6<br>(0.0)   | 0.6<br>(2.3)   | 0.0<br>(0.0)   | 0.0<br>(0.0)   | 0.0<br>(0.6)   | 0.0<br>(0.6) | 8.5<br>(10.7)    |
| 1970                       |              | 3.0<br>(5.1) | 0.6<br>(1.1) | 0.0<br>(2.8)   | 0.0<br>(0.6)   | 0.0<br>(0.0)   | 0.0<br>(0.0)   | 0.0<br>(0.0)   | 0.0<br>(0.0) | 3.6<br>(9.6)     |
| 1971                       |              |              | 7.9<br>(6.2) | 0.6<br>(1.1)   | 0.6<br>(2.8)   | 0.6<br>(2.3)   | 0.0<br>(1.1)   | 0.0<br>(0.0)   | 0.0<br>(0.0) | 9.7<br>(13.6)    |
| 1972                       |              |              |              | 9.1<br>(7.3)   | 1.8<br>(4.5)   | 1.2<br>(2.8)   | 0.0<br>(1.7)   | 0.6<br>(0.6)   | 0.6<br>(0.0) | 13.3<br>(17.0)   |
| 1973                       |              |              |              |                | 10.9<br>(10.2) | 1.2<br>(2.3)   | 0.0<br>(2.3)   | 0.6<br>(0.0)   | 0.0<br>(0.0) | 12.7<br>(14.7)   |
| 1975                       |              |              |              |                |                | 13.9<br>(10.2) | 6.7<br>(2.8)   | 2.4<br>(1.7)   | 0.0<br>(1.1) | 23.0<br>(15.8)   |
| 1977                       |              |              |              |                |                |                | 13.3<br>(5.1)  | 0.6<br>(5.1)   | 0.6<br>(0.0) | 14.6<br>(10.2)   |
| 1978                       |              |              |              |                |                |                |                | 6.7<br>(2.8)   | 0.6<br>(1.7) | 7.3<br>(4.5)     |
| 1980                       |              |              |              |                |                |                |                |                | 7.3<br>(4.0) | 7.3<br>(4.0)     |
| TOTAL                      | 5.5<br>(3.4) | 4.2<br>(7.3) | 9.1<br>(9.0) | 10.3<br>(11.3) | 13.9<br>(20.3) | 17.0<br>(17.5) | 20.0<br>(13.0) | 10.9<br>(10.7) | 9.1<br>(7.3) | 100.0<br>(100.0) |

Table 2

## PREDICTED EFFECTS OF SHIFT VARIABLES ON HAZARD FUNCTIONS

A. Entry into FFH Poverty<sup>a</sup>

| sign $\frac{\partial h}{\partial x_j}$ | (-)   | (-)   | (-)   | (+)   | (+)   | (+)   | net effect =<br>sign $\partial h / \partial x_1$ |
|----------------------------------------|-------|-------|-------|-------|-------|-------|--------------------------------------------------|
| $x_1$ $z_1$                            | $x_0$ | $z_1$ | $z_2$ | $z_3$ | $z_4$ | $z_5$ |                                                  |
| AFDC                                   |       |       |       | +     |       |       | +                                                |
| AFDCSQ                                 |       |       |       | -     |       |       | -                                                |
| AGE                                    |       |       | -     | -     |       | -     | ?                                                |
| AGESQ                                  |       |       | +     | +     |       | +     | ?                                                |
| DUNCAN                                 | +     | +     | +     |       |       |       | -                                                |
| KW                                     |       |       |       |       |       |       | ?                                                |
| IFEMALE                                |       |       |       | ±     |       |       | ±                                                |
| STATEY                                 | +     | +     | +     | +     |       |       | ?                                                |
| TWOPAR                                 | +     | +     | +     |       |       |       | -                                                |

B. Exit from FFH Poverty<sup>b</sup>

| sign $\frac{\partial h}{\partial x_j^*}$ | (-)     | (-)     | (-)     | (+)     | (+)     | (+)     | net effect =<br>sign $\partial h^* / \partial x_1$ |
|------------------------------------------|---------|---------|---------|---------|---------|---------|----------------------------------------------------|
| $x_1^*$ $z_1^*$                          | $x_0^*$ | $z_1^*$ | $z_2^*$ | $z_3^*$ | $z_4^*$ | $z_5^*$ |                                                    |
| AFDC                                     |         |         | +       |         |         |         | -                                                  |
| AFDCSQ                                   |         |         | -       |         |         |         | -                                                  |
| AGE                                      |         |         | +       | -       |         | -       | +                                                  |
| AGESQ                                    |         |         | -       | +       |         | +       | -                                                  |
| DUNCAN                                   | +       | +       | +       | +       |         |         | +                                                  |
| KW                                       | +       | +       | +       | +       |         |         | ?                                                  |
| IFEMALE                                  |         |         |         |         |         |         | ?                                                  |
| STATEY                                   | +       | +       | +       | +       | -       |         | -                                                  |
| TWOPAR                                   | +       | +       | +       |         |         |         | ?                                                  |
| KIDS                                     |         |         |         |         | -       | -       | -                                                  |
| UCYCLIC                                  |         |         |         |         | -       | -       | -                                                  |

## Panel C. Variable Definitions

- AFDC: maximum benefits available in 1984 under Aid to Families with Dependent Children for a 3-person family (mother and 2 children) in the current state of residence (in hundreds of dollars).
- AFDCSQ: square of (AFDC - 3).
- AGE: age in years. This is a time-varying variable (age at beginning of spell + duration of spell to date).
- AGESQ: (AGE - 25)<sup>2</sup>.
- DUNCAN: NLSY Duncan score for head of household at age 14 divided by 100.
- KW: knowledge of the world of work calculated from a test given the respondents.
- IFEMALE: 1970 Census percentage of women in current state of residence.
- STATEY: per capita income for 1979 in the current state of residence (from the 1980 Census).
- TWOPAR: dummy for two-parent family when the woman was age 14.
- KIDS: number of children in the woman's family in the survey prior to entering FFH-poverty.
- UCYCLIC: aggregate unemployment rate minus the estimated normal (full employment) unemployment rate.
- NOSTATE: a dummy variable = 1 when the respondent's state of residence is unknown. In this case we set AFDC, AFDCSQ, IFEMALE, and STATEY to their means.

<sup>a</sup>Elements of columns 2-3 are sign  $(\partial x_j / \partial x_1)$ , where  $x_1$  is an element of the vector  $x_j$  in equation (11).

<sup>b</sup>Elements of columns 2-3 are sign  $(\partial x_j^* / \partial x_1^*)$ , where  $x_1^*$  is an element of the vector  $x_j^*$  in equation (12).

Table 4

SAMPLE MEANS FOR ESTIMATED HAZARD FUNCTION VARIABLES (100% POVERTY THRESHOLD)

| Variable                          | ENTRY HAZARDS        |                   |              |                    |                    |                    |                 | EXIT HAZARDS          |               |               |
|-----------------------------------|----------------------|-------------------|--------------|--------------------|--------------------|--------------------|-----------------|-----------------------|---------------|---------------|
|                                   | FFH → FFHPOV         |                   |              | FFH → FFH          |                    | logit              | FFHPOV → FFHPOV | FFHPOV → FFHPOV       |               |               |
|                                   | pooled<br>(1) or (2) | white<br>(3)      | black<br>(4) | white<br>(5)       | black<br>(6)       |                    |                 | pooled<br>(9) or (10) | white<br>(11) | black<br>(12) |
| BLACK                             | .26                  |                   |              | same as column (3) | same as column (4) | .48                | .38             | .56                   |               |               |
| AFDC                              | 3.20                 | 3.47              | 2.43         |                    |                    | 3.17               | 3.32            | 2.81                  | 3.29          | 2.44          |
| (AFDC-3) <sup>2</sup>             | 1.86                 | 1.93              | 1.65         |                    |                    | 1.97               | 2.09            | 2.58                  | 2.76          | 2.44          |
| STATEY                            | 7.13                 | 7.28              | 6.72         |                    |                    | 7.14               | 7.24            | 6.38                  | 6.67          | 6.16          |
| AGE <sub>t</sub>                  | 18.77 <sup>a</sup>   | t.v. <sup>b</sup> | t.v.         |                    |                    | 25.45 <sup>c</sup> | t.v.            | 24.9 <sup>d</sup>     | t.v.          | t.v.          |
| AGESQ                             | 48.01                | t.v.              | t.v.         |                    |                    | 17.22              | t.v.            | 15.42                 | t.v.          | t.v.          |
| DUNCAN                            | .32                  | .37               | .17          |                    |                    | .26                | .30             | .23                   | .33           | .55           |
| KWW                               | 7.27                 | 7.80              | 5.73         |                    |                    | 6.59               | 7.39            | 6.05                  | 7.17          | 5.19          |
| KIDS                              |                      |                   |              |                    |                    |                    |                 | 1.68                  | 1.64          | 1.71          |
| XFEMALE                           | 51.3                 | 51.3              | 51.4         |                    |                    | 51.35              | 51.34           | 46.2                  | 46.6          | 45.8          |
| TWOPAR                            | .82                  | .87               | .66          |                    |                    | .70                | .78             | .63                   | .73           | .55           |
| NOSTATE                           |                      |                   |              |                    |                    |                    |                 | .10                   | .09           | .11           |
| UCYCLIC <sub>t</sub> <sup>e</sup> |                      |                   |              |                    |                    | .10                |                 | t.v.                  | t.v.          | t.v.          |
| sample size                       | 4297                 | 3200              | 1097         |                    |                    | 817                | 338             | 456                   | 199           | 257           |

<sup>a</sup> AGE is time varying. This is the mean age in the first year of the sample, 1968.

<sup>b</sup> t.v. denotes time varying variable.

<sup>c</sup> AGE is time varying. This is the mean age upon first entry into FFH.

<sup>d</sup> AGE is time varying. This is the mean age upon entry into FFH-poverty.

<sup>e</sup> For the survey years between 1968 and 1982 the annualized values of UCYCLIC were -1.2, -1.4, -1.7, -.4, .4, -.1, -.55, 2.2, 1.1, .05, 1.7.